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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/597,809

03/27/2007

Maurice Howard Fisher

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EXAMINER

INGHAM, JOHN C

ART UNIT

PAPER NUMBER

2814

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/597,809	<b>Applicant(s)</b> FISHER ET AL.	
	<b>Examiner</b> JOHN C. INGHAM	<b>Art Unit</b> 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,7-11,13,14 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-11,13,14 and 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 October 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1, 2, 7-11, 13 and 14** are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki (US 5,440,152, previously cited).

3. Regarding claims **1 and 13**, Yamazaki discloses in Figs 6 and 7 a semiconductor device and a method of manufacture comprising a substrate (1, 2) of a first semiconductor material (Si) and a compound layer (3A, 3B) of said first semiconductor material and a second semiconductor material (Ge) disposed on the substrate, the ratio of the first material to the second material of the compound layer being decreased (Fig 6 region 3B, Si content decreases) away from the substrate towards the upper surface of the compound layer (interface of 3A and 10), wherein the rate of decrease of the ratio is linear and different on opposite sides of an intermediate point (interface of 3B and 3A), and wherein the ratio is decreasing on opposite sides of the intermediate point, and wherein the ratio of the first material to the second material of the compound layer decreases from the intermediate point to the upper surface of the compound layer (Si content is 97% at intermediate point and is 92% at upper surface).

Art Unit: 2814

4. Regarding claims **2 and 14**, Yamazaki discloses in Fig 6 the device and method of claims 1 and 13, in which the rate of decrease of the ratio increases away from the substrate towards the surface of the compound layer (rate of 3A is more than 3B).

5. Regarding claim **7**, Yamazaki discloses in Fig 5 the device of claim 1, in which a final layer (13) comprising said first material (Si) is deposited on the surface of the compound layer (10, also SiGe).

6. Regarding claims **8 and 9**, Yamazaki discloses the device of claim 1, in which the first material is silicon and the second material is germanium.

7. Regarding claims **10 and 11**, Yamazaki discloses the device of claim 1, in which the composition of the compound layer at the upper surface thereof (upper surface of SiGe at 3A) comprises substantially 20% of said second material (Ge, see col 4 ln 27-35).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

Art Unit: 2814

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claim **17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki and Murthy (US 6,723,622, previously cited).

11. Yamazaki discloses the method of claim 13, but does not specify wherein the ratio of the first material to the second material of the compound layer is decreased in part by decreasing a temperature at which the layer is deposited from the substrate towards the surface of the compound layer.

12. Murthy teaches that decreasing the ratio of silicon to germanium in a graded composition layer (compound layer) is accomplished by also decreasing the temperature at which the layer is deposited, in order to produce a layer with low defect density (col 3 ln 8-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Murthy in the method of Yamazaki in order to produce a layer with low defect density.

### ***Response to Arguments***

13. Applicant's arguments filed 6 Oct. 2010 have been fully considered but they are not persuasive. Regarding the argument on pages 5 and 6, Yamazaki discloses that the ratio of the materials at the intermediate point (i.e. the interface of 3A and 3B) is about 3% Ge (97% Si) and that the ratio of the materials at the upper surface of the compound

Art Unit: 2814

layer is about 8% Ge (92% Si). Therefore the ratio decreases from the intermediate point to the upper surface of the compound layer (col 7 ln 47-57). Furthermore, Yamazaki recites that the peak Ge concentration of 20% may be at the surface of 3A (col 4 ln 27-35).

### ***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN C. INGHAM whose telephone number is (571)272-8793. The examiner can normally be reached on Monday to Friday, 9AM to 5PM.

Art Unit: 2814

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wael M Fahmy/  
Supervisory Patent Examiner, Art  
Unit 2814

/J. C. I./  
Examiner, Art Unit 2814